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DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

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DISEASES of the NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Psychopenetration

(Cybernetic Treatment of the Unconscious)

PAUL H. WILCOX, M.D.*
Traverse City, Michigan

When a person takes five breaths of a 20% carbon dioxide (CO_2)-80% oxygen (O_2) mixture he often experiences a number of transient subjective sensations in addition to the two strictly physiological reactions, namely sensing the odor of the gas and breathing more deeply. These additional subjective sensations, which include dizziness, fleeting pains, numbness, tingling, fear, depression, trembling, anger, blurring of vision, cloudy thinking, sleepiness, etc., constitute projections from the unconscious mind onto the conscious mind in response to the CO_2 stimulus. They can all be made to disappear by appropriate analysis. The procedure is for the psychotherapist to discuss with the patient the possible wishes and counter-wishes associated with each unit reaction. Then the patient is given another five breaths of the CO_2 mixture to see if the analysis has been correct. If the unit reaction is no longer present, it can be concluded that the analysis was correct and it thus released the unconscious conflicts producing the reaction. If the unit reaction is still present, it means that the analysis was not the key to the reaction and another attempt is made. The sample CO_2 reactions can be taken as frequently as desired, depending on how long the discussion between samples lasts. For example, often ten or more such samples can be obtained during an hour interview.

Cybernetics may be briefly defined as "controlled communication." It is now recognized as an important principle in the action of the nervous system. Every action in the body economy is normally regulated by means of feed-back mechanisms which inform the central agency as to the state of the more peripheral activity so that the next out-going message from the central agency is modified according to the results of the previous out-going messages. If the psychotherapeutic situation is made analogous, the therapist can be considered the central agency and the patient's unconscious mind as the receiver of the therapists communications. However, there are many barriers to getting the message through to the patient's unconscious mind and previously there was no convenient method of getting a report back which indicated whether the message did penetrate. Obviously, when one does not know which messages get through, there is much wasted effort in trying to figure out what new messages to send. However, the reactions to inhalations of CO_2 mixtures do serve as reports back from the patient's unconscious mind to the therapist so the cybernetic principles of communication can be carried out.

Any modality which aids in changing the state of the unconscious mind can be con-

*Research Director, Traverse City State Hospital.

sidered a part of psychopenetration but the aspect to be considered in this paper is a brief introduction to the use of the reactions to carbon dioxide inhalations in both non-coma and coma doses as indications of psychotherapeutic progress. The goal of the therapy is the relief of clinical symptoms but often these are not relieved until considerable progress in the psychopenetration has occurred so it is convenient to have this delicate indicator of the state of the unconscious mind.

When the reactions to the CO_2 samples are reduced to the physiological ones of odor and respiratory stimulation, the subject can then be put to sleep with CO_2. The CO_2 sleep brings out many additional reactions but most of these are psychodynamic and can be subtracted by appropriate analysis. The aim of the psychopenetration is to produce a symptom-free person with very mild reactions to CO_2 sleep. In the past the failure to relieve the symptoms at the superficial level measured by the CO_2 samples apparently interfered with the progress of the CO_2 sleep therapy. It would appear that satisfactory progress is achieved if the therapy deals with successive layers. For example, if the patient consciously withholds information from the therapist, that conscious block may block the attempts to solve the deeper level problems indicated by the reactions to CO_2 sleep.

Psychopenetration Test

Over sixty special questions have been devised which help to reach the unconscious mind. Most of these can be classified as related to seven selected questions which the author has chosen for the psychopenetration test. The answers to these questions for the conscious mind are all "no," but the answers for the unconscious mind are believed to be "yes." The test is to determine whether the subject can understand the meaning of a yes answer for his unconscious mind on one or more of the seven questions. If the subject cannot understand a yes answer for any of the seven questions, he is considered rigid to the test and the evidence is that psychotherapy is in that case very ineffective. Such a person requires various types of physiological treatment and when flexibility to the test is achieved, then the psychotherapy can profitably be pursued.

The seven test questions are:

1. Do you unconsciously believe you *own* everybody and everything all the time?
2. Do you unconsciously want *attention* from everybody and everything all the time?
3. Do you unconsciously have *sexual feelings* toward everybody and everything all the time?
4. Do you unconsciously want to *kill* everybody and everything all the time?
5. Do you unconsciously want to *submit* to everybody in every way all the time?
6. Do you unconsciously want to *show all* your *feelings* to everybody all the time?
7. Do you unconsciously want to *deceive* everybody all the time?

A complete proof of all these questions will not be attempted here but it may be said that the evidence is obtained from the behavior of infants and children and from all phases of cultural adjustments. These questions bear on what may be called drives of the unconscious mind and have been vividly demonstrated in CO_2 sleep reactions. In fact these questions have been formulated out of the evidence accumulated from giving over 7,000 treatments to nearly 500 people. An important observation is that the reactions to CO_2 stimulation constitute unit reactions related to particular unconscious conflicts and these unit reactions repeat until the corresponding unconscious conflict has been decreased by some means.

Analysis of the CO_2 Non-Coma Reactions

The psychodynamic reactions to 5 inhalations of 20% CO_2-80% O_2 appear to be related to conversion symptoms. Therefore all patients with psychosomatic or psychophysiologic symptoms and various psychoneurotic conversion symptoms should be carefully studied with CO_2 samples first. The unconscious struggle can be pictured as involving primitive defense reactions in a jungle. If one feared that he was going to be killed by an enemy he would have a variety of choices. He might counterattack and attempt to kill the enemy. He might run away (coward), or run to a safe place

(to mama and be a baby), or make believe he hurt all over (to gain pity), or attempt to deceive the enemy, or play dead to be unnoticed. His third general type of reaction might be submit, thus running the risk of death but hoping to save his life perhaps at the price of slavery. In the analysis of the CO_2 reaction it is important to identify the would-be attacker as well as the pictured mode of reaction. Let us suppose the CO_2 sample elicits a transient headache. This represents a part of the "hurt all over" mechanism to gain pity from the opponent. The patient is asked who was the greatest threat to him in his childhood. Each possibility is discussed and an attempt is made to find an "enemy" toward whom the patient recognizes a tendency to defend himself by seeking pity. Then another CO_2 sample is given to see if the headache repeats. If the headache does repeat, the quest is pursued further till a formula is found which does prevent the appearance of headache with the CO_2 sample. In the meantime, important topics of personal history are being uncovered. It may be mentioned that this method is very effective in children and does not arouse fear in them. In fact they enjoy the adventure of seeing what they will notice in the next sample. The "play dead" mechanism includes the unconscious wishes to be "blind," "deaf," "mute," "numb," "paralyzed" and to "fall down (dizzy)." These are common sensations elicited by the CO_2 samples and disappear when the unconscious reasons for the reactions have been worked out.

Analysis of the CO_2 Coma or Sleep Reactions

When the CO_2 non-coma reactions have been reduced to the physiological residuals, namely odor and slight stimulation of respiration, it may be desirable to proceed to the CO_2 coma reactions. When the non-coma reactions are dealt with first, the patients usually experience less fear with the treatments and the occasional major conversion reactions to CO_2 coma tend to be avoided. The author induces CO_2 sleep by starting the patient off with breathing a 20% CO_2-80% O_2 mixture. At the tenth breath a small stream of 100% CO_2 is led into the rebreathing bag so that the CO_2 gradually builds up. The mask is removed when the patient has a secondary slowing of respiration and some tremor. This is usually with 30 to 50 inhalations but if the patient's breathing is rapid, it may take 80 to 90 breaths to reach the desirable state of coma. After the mask is removed the patient awakens spontaneously, the whole procedure lasting about three minutes. Every part of the patient's reaction to the CO_2 is significant. It is convenient to record the reaction patterns during the CO_2 treatment according to the following periods:

1a. From the first to the tenth inhalations.

1b. From the tenth inhalation till the mask is removed.

2. The period of deep coma with tremors and slowed respiration.

3a. From the beginning of decrease of the tremors to signs of semi-consciousness.

3b. From the first signs of semi-consciousness to full awakening.

Then the patient is encouraged to report his dream in detail if there was one.

The CO_2 dream tends to be more limited in theme than spontaneous night dreams and tends to repeat unless the problem is solved. It is possible to put the patient to sleep with CO_2 several times at one sitting in order to test the correctness of the analysis of the behavior response or the dream response.

After the dream is as clearly described as possible, an attempt is made to formulate the unconscious wish which produced it and the counter-wish which made the dream possible. Without the counter-wish the unconscious wish would emerge into consciousness as a thought or a deed and not be retained at the dream level. The dream is considered as a sort of marionette show which is completely controlled by the unconscious wishes.

The unconscious creates all the players and dictates all the action in the dream. It is an important step in the patient's understanding to recognize that the dream results from his own unconscious wishes. "Who dreamed the dream?" is the important question leading to this insight. When the patient understands the drama of the unconscious wishes and counter-wishes producing

the dream, the next CO_2 dream will change. Some attempts have been made to influence the CO_2 dream content by direct suggestion. The failure of the author to accomplish this is understandable because the dream deals with unconscious repressed wishes. In this connection the therapist only can subtract from the reaction pattern. If he helps the patient have insight into the unconscious conflicts, the repression is dissolved and the patient is no longer able to dream that theme.

Comparison with Psychoanalysis

There is no basic conflict between psychopenetration and the discoveries of psychoanalysis even though the technique is very different. It appears possible to achieve insight into the mechanisms of the unconscious mind much faster by psychopenetration than by psychoanalysis. It is desirable to have a training psychopenetration so that one's own unconscious resistances will not interfere too much with insights into the patient's problems.

Twelve one hour individual sessions during a four week training period have provided a significant degree of insight in the first series of training psychopenetration psychiatrist candidates.

Prophylactic Psychopenetration

Latent emotional conflicts can be detected in symptom-free people by means of the stimulation with non-coma and coma doses of CO_2. These latent conflicts can then be treated by psychopenetration and it is reasonable to conclude that various degrees of emotional illness would thus be prevented by the decrease of the accumulating conflicts in the unconscious mind. Thus this procedure can be recommended as part of a general check-up to head off illness.

Discussion

Meduna has stressed the neurophysiological reactions to CO_2 and has minimized the importance of psychotherapy with the treatments. The neurophysiological reactions are admittedly very important as the basis for the facilitation of the psychodynamic changes resulting from the CO_2 treatments, but the principles of psychopenetration make it possible to increase the rate of clinical improvement and the resulting insights give the patient a sound basis for an appropriate long range personality reorganization.

Summary

The author has presented a brief outline of a new method of treating unconscious conflicts by special methods of analysis and by using the reactions to CO_2 inhalations at non-coma and coma levels as cybernetic measures of success in reaching the unconscious.

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The Relation of the Family To Manic-Depressive Psychosis

CECILE BOLTON FINLEY, PH.D., and DAVID C. WILSON, M.D.

Richmond, Virginia

No definite cause for manic-depressive psychosis is known but many writers are convinced that there is a hereditary factor. Undoubtedly there are certain intra-personality configurations that are common to persons developing the disease. These characteristics are thought by many to be produced by the culture medium within which the person is nurtured. The common view is expressed by Myerson: "It is not doubted at the present time that the fundamental basis of manic-depressive psychosis is in an inherited constitution. The vast literature on this subject is practically unanimous, although it also appears from certain studies that there probably is an environmental root to the development of this psychosis although what that environmental root may be no one knows."[1] It is to find this unknown environmental root that this study is made.

The social status of persons developing this condition is well established. Landis, Carney and Page have this to say about the matter: "The social status of manic-depressive patients is well above that of all the organic psychoses and of dementia praecox. Comparatively few manic-depressive patients come from either the low educational or economic levels. A large number have attended high school and college. The economic status of those admitted to state hospitals is not the highest, but this may be due to the fact that the wealthier manic-depressives go to private institutions. This disease is responsible for 16.7% of first admissions to private hospitals and for only 12.9% of first admissions to state mental hospitals."[2] It is the family of the American middle class that supplies the majority of the patients of the manic-depressive group. In a German psychiatric clinic to which patients are admitted irrespective of social position, Luxemberger found manic-depressive psychosis to be nearly three times as frequent in the highest social class and four times as frequent in the professional class as in the general population.[3] The influence of Western European culture is very similar to that found to prevail in the United States.

This Western European culture which has passed over the seas to develop in a more rigid form in the United States was based on family formation. The family unit as it has developed in its strict form is stronger than its parts, and the individual often has to bend to fit the mold constructed by family tradition. Individuals ceased to move freely at their own initiative but bowed to family dominance. Frequently the father or the mother is dominant in the group but more often there is a multiphasic dominance resting now on the father, now the mother, or the older brothers, while all the time the family is the influence that controls behavior.[4]

Margaret Mead in the discussion of Ruth Benedict's paper regarding the effect of swaddling of infants suggests that the way the swaddling is done, not the act itself, is what influences the after-life of the child. The meaning to the family of swaddling is translated in non-verbal emotional language to the child so that the development of the Pole, the Jew and the Russian is differentiated not by similar act, but by the dissimilar meaning.[5] It is not what the family does, but what the meaning is behind the behavior that shapes the child.

Spurgeon English in reporting on observation of trends in manic-depressive psychosis states that "The manic-depressive with his lack of love in early life feels a greater need for love expressed on a childish level than the average." Frieda Fromn Reichmann in discussing English's paper

makes a contribution from her biographical data. She says: "I wish to elaborate on Dr. English's statement that 'this is due to faulty handling of love and hatred in early childhood.'[6] From the childhood history of our patients they come as a rule from families with multiple family figures. Moreover, there is usually no one who is interested in the welfare of the child in his own right. The relatedness of the grown-ups to the child is determined by the purpose for which it is needed and by the role into which it is cast according to the need of the family. * * * They (these families) accomplish these necessities by eagerly cultivating their part in a closely knit group unity and by adhering and teaching their young to adhere to their conventionalized group values. * * * Manic-depressives can only be treated successfully if the therapist is able to help them break through their clinging dependence upon the family and its substitutes and to revaluate the conventional group values of the family."[7]

These writers believe that manic-depressive psychosis is a disease of the upper economic bracket and also of families of the better social standing. There is a distinct feeling that in the environment there is some causative factor. Since the disease is apparently a family affair, it is well to look into the families of persons who suffer from the disease to see how they differ from families in which the disease does not develop.

A typical American family is supposed to be an Anglo-Saxon middle-class family of Protestant faith. This typical family is found in its most static form along parts of the Eastern Seaboard and in the Southern States.[8] It is interesting to find that studies by the U. S. Department of Commerce Bureau of Census published in 1948 in their Bulletin regarding patients in mental institutions of 1916 show that the percentage of first admissions that are diagnosed as having manic-depressive psychosis average at least one-third more in the Southern states than in any Northern or Western states, other than Maine in the Northeast and Wisconsin in the North Central district, a finding that suggests again the family relationship to the disease.[9]

TABLE I

AVERAGE RATES OF MANIC DEPRESSIVE PSYCHOSIS

TOTAL FIRST ADMISSIONS—NORTH, SOUTH, MIDWEST, WEST

NORTH

Male: 6 Vary from Average. More Than One Fourth Average.

Female: 14 Vary from Average. More Than One Fourth Average.

	Male	*Female*
NEW ENGLAND		
Maine	10%	23%
New Hampshire	6%	5%
Vermont	7%	17%
Massachusetts	3%	8%
Rhode Island	8%	19%
Connecticut	4%	8%
MID-ATLANTIC		
New Jersey	6%	12%
Pennsylvania	6%	12%
New York	3%	5%
EAST NORTH CENTRAL		
Ohio	6%	10%
Indiana	5%	13%
Illinois	3%	7%
		(Average 10%)
SOUTH ATLANTIC		
Delaware	7%	22%
Maryland	2%	4%
District of Columbia	6%	5%
West Virginia	6%	16%
NORTH CENTRAL		
Michigan	5%	7%
Wisconsin	13%	21%
AVERAGE	6%	12%

TABLE II

SOUTH

	Male	*Female*
Kentucky	7%	16%
Tennessee	9%	28%
Alabama	19%	29%
Mississippi	8%	12%
Virginia	12%	27%
North Carolina	16%	29%
South Carolina	13%	16%
Georgia	12%	12%
Florida	7%	29%
Florida	7%	29%
AVERAGE	11%	22%
MID-WEST		
Minnesota	8%	13%
Iowa	7%	12%
Missouri	6%	17%
Arkansas	8%	14%
Louisiana	4%	8%
North Dakota	8%	8%
South Dakota	8%	13%
Nebraska	3%	2%
Kansas	12%	19%
Oklahoma	6%	13%
Texas	9%	21%
AVERAGE	7%	13%
WEST		
Montana	8%	13%
Wyoming	7%	17%
New Mexico		(No Figures)
Idaho	8%	8%
Utah	9%	16%
Arizona	11%	17%
Nevada	3%	8%
Washington	9%	18%
Oregon	8%	15%
California	6%	19%
AVERAGE	7%	14%

From these data it was thought worthwhile to study the relationship of the family organization in the South in relation to this disorder. Immediately a remarkable family was unearthed where two brothers had married two sisters. The family of the older couple had four children. Three of these developed manic-depressive psychosis. The younger couple had six children, none of whom developed any signs of the disease. It was apparent that if there was an environmental factor at work in the family organization, it would be evident in this setting. Ida P and Carrie P were sisters. Ida was the older and more dominant. Fred Q and Charlie Q were brothers. Fred was the older but very passive, easy-going and submissive, while Charlie, the younger, was more self-assertive. Charlie and Carrie made a better team than did Fred and Ida.

TABLE III

"Q" FAMILY TREE — PATERNAL SIDE

GRANDFATHER—JOHN RHODES Q (BAPTIST MINISTER) MARRIED EMMA

SIX SIBS

JOHN R. (Dead)	CONNIE	BERTIE	CHARLES	FREDERIC H.	JOHN R.
	M.—J.O.	M. MILLARD	M. CARRIE	M. ADA	M. JO ANN
	1. SIB—Leslie	6 SIBS	6 SIBS	4 SIBS	3 SIBS
	M. Russell E.	1. Harry	1. Lawrence R.	1. Frederic H.*	1st Lois (Dead
		M. Gretchen	M. Ella N.	M.	2nd Sarah Louise
		No Sibs	2. Guilford	2. Dean*	(1 Sib. Fred, Jr.)
		2. Virginia*	M. Ethel K.	M. Louise (No Sibs)	
		M. James	3. Velma	3. Payne*	
		3. Phillip	M. S. H.	M. Louise (No Sibs)	
		M. & Sibs	4. Marjorie	4. Willard (Dead)	
		4. John	M. Clarence E.	M. Dorothy (1 Sib Dorothy)	
		M. & Sibs	5. Vernon		
		5. Alfred	M. Agnes		
		Unmarried	6. Charles		
		6. Elizabeth	Unmarried		
		Unmarried			

*Persons with affective disorder.

TABLE IV

"Q" FAMILY TREE — MATERNAL SIDE

GRANDFATHER JOHN T. (METHODIST MINISTER) MARRIED ELLEN CUSHEN

TEN SIBS

JOHN T. (DEAD)	FRANK M.	ADA DORSEY M. FREDERIC H. Q. (4 SIBS)	CARRIE M. CHARLES Q. (6 SIBS)	THOMAS E. M.	INDA M. WALTER F. CLARK	MORRIS (DEAD)	LIL NELL* M. BAKE B. WOODSON (1 SIB)	PEARL (DEAD) M. HALE CONNOLLY (NO SIBS)

I	II
1. Frederic H.*	1. Lawrence R. M. Elle Nancy
M. Lois	(2 Sibs Girls)
2nd Sarah	2. Guilford M. Ethel
(1 Sib)	(3 Sibs Girls)
2. Dean*	3. Velma M. S. H.
M. Louise	(1 Sib Girl)
3. Payne*	4. Marjorie M. C. E.
M. Louise	(2 Sibs Girls)
4. Willard (Dead)	5. Vernon M. Agnes
M. Dorothy	(2 Sibs Girls)
(1 Sib)	6. Charles—Unmarried

*Persons with affective disorder.

Investigation of the two families showed that although they lived and developed within a mile of each other, the intra-family setting was entirely different. Family "Q" was very close and a dominant mother held the group together as a unit so that even in adult life her four sons were controlled by family pressures, while in the other family the discipline was stern but each member was permitted to follow his own inclinations as an individual. The desires of the individual were fostered by the parents for the greater good of the child rather than from the standpoint of family unity or welfare of

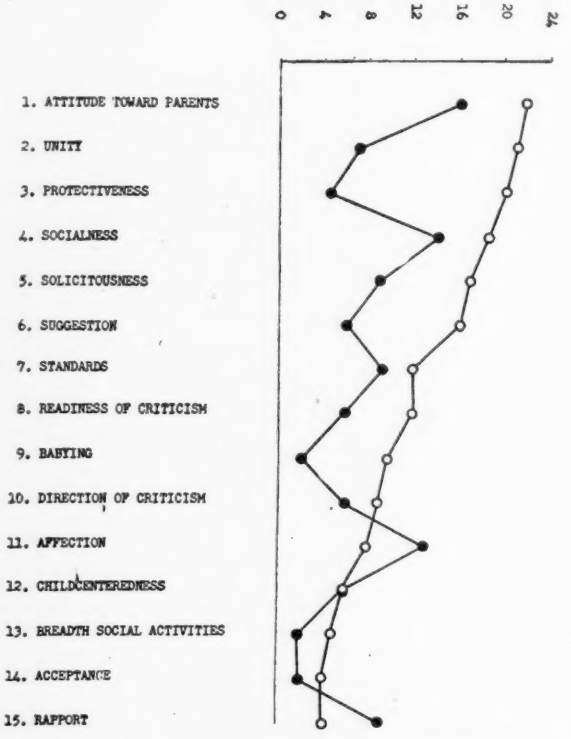

Figure 1. Comparison of scores of manic depressive patients with scores of normal controls on Fels Traits indicated. Positive scores represent extremes of pressure.

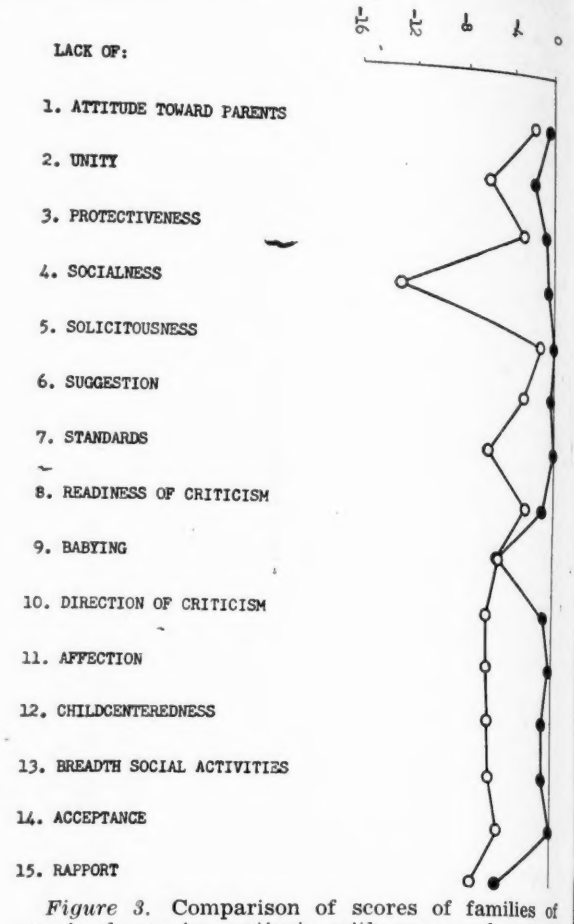

Figure 3. Comparison of scores of families of manic depressive patients with scores of normal controls on Fels Traits indicated. Negative scores represent extremes of freedom.

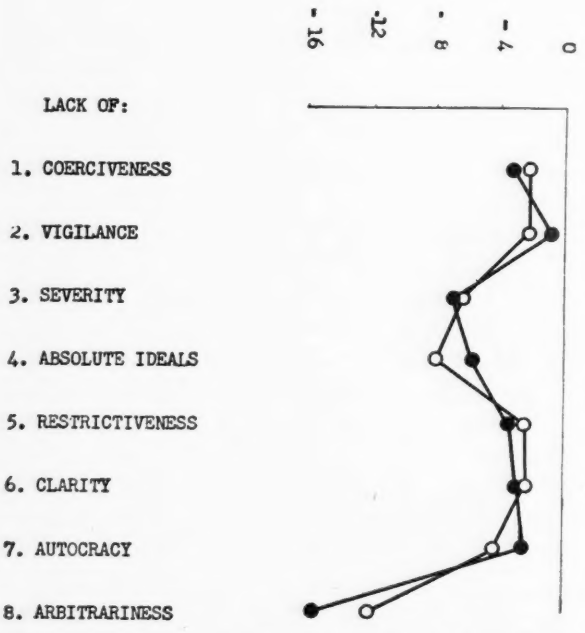

Figure 2. Scores of families of manic depressive patients and normal controls on Fels discipline rating. Positive scores represent extremes of pressure.

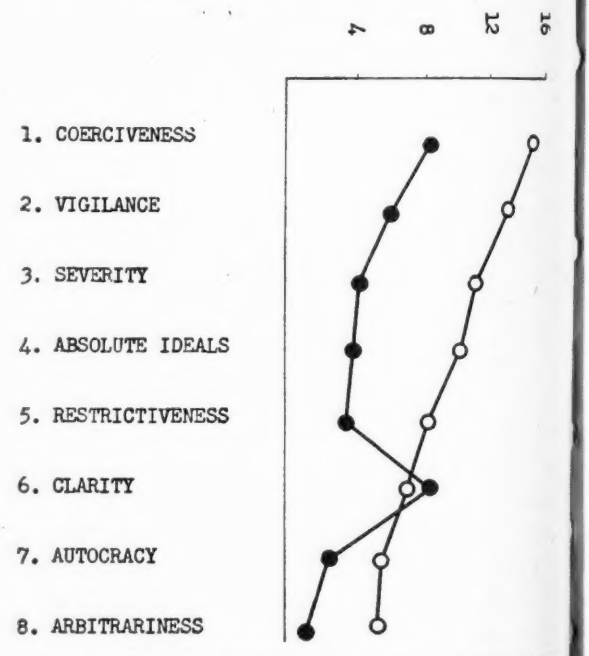

Figure 4. Scores of families of manic depressive patients and normal controls on Fels discipline rating. Negative scores representing extremes of freedom.

the group. The occurrence of severe crippling illness and the tragedies that went with it obscured the picture of the development of Family "Q," and even today, after the mother and father are gone, the thinking of the surviving members is first of the family. Their property belongs to the group rather than to individuals.

The investigation of this family has led to selection of ten families in which manic-depressive disorders have occurred, and ten families of similar economic status as well as size in which there has been no evidence of the condition. It is planned to study the groups by means of a questionnaire and by means of individual interviews until a picture of the family can be drawn. This study is still under way, and to date only five families have had a thorough study. From these studies a concept is forming, but presentation of this concept of the family setting characteristic of the affective disorders will have to wait further examination before it can be expressed. However, interesting data has been compiled. A modified family opinionnaire intended to show patterns of parent behavior was employed. This Fels Rating Scale was originated by the Fels Research Institute.[10] It studies the opinion of the members of the family regarding the family organization and the parental discipline. The opinion of the member is gauged by degrees above or below the culture norm. The degrees positive or above the norm denote family pressure in certain traits, while degrees negative denote freedom from coercion in these traits. Fifteen opinionnaires of members of manic-depressive families were graded and thirty opinionnaires from adult college students in whose families there was no known disease were contrasted with the fifteen. The figures 1-4 show graphically the differences between the manic-depressive and the normal controls.

Although the number of opinionnaires examined is limited and the families studied still very few, already a definite difference has been demonstrated. There is something in the family setting that is of significance in the construction of manic-depressive psychosis. The setting of a family pattern by a dominant mother, a dominant father or by dominant siblings constructs a walled-in existence for family members which frustrates individual initiative and makes weaker members feel guilty because of the ensuing hostility. This hostility to their fixed life leads to an attitude which causes depression, or an explosion outward which appears as mania.

Summary

This paper seeks to demonstrate that manic-depressive psychosis is most frequently found among members of families with traditions of the more intellectual and better established groups. The disease is more common in the South. Detailed studies of five Southern families indicate that there is a different pattern of organization and discipline in families prone to the disease. A contrast of opinionnaires filled out by members of such families with members of supposedly sound families substantiates this difference.

Authors' Note: This paper represents a preliminary note on a joint project undertaken by the Department of Psychology of Hollins College and the Department of Neurology and Psychiatry of the University of Virginia.

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Evaluation of Air Studies

F. REITMAN, M.D.*

Coulsdon, England

Heinrich (1940), confirmed in the "normal" population that with advancing age there is a progressive ventricular dilation as evidenced by pneumo-encephalography. This worker also found with AP views in a hundred cases of "normals," that the left lateral ventricle was more dilated than the right. Larsby and Lindgreen (1940), studying 125 epileptics, found that with AP views there was a greater enlargement on the left side of the anterior horn than on the right, and Boenig, also studying epileptics, came to similar conclusions. In all these reports the measurement on which the conclusions have been based, was the transverse diameter of the anterior horn, as seen in an AP position. The pneumo-encephalographic findings, however, have been estimated on the grounds of appearance only and have not been closely enough scrutinized; this will be attempted in the present study.

Technique and Material

The cases discussed in this study had pneumoencephalography by the lumbar route and as a standard measure 50 cc. of fluid was replaced by 45 cc. of air. Although several authorities, P. Chodoff et al (1948), Davidoff (1946), Larsby and Lindgreen (1940), etc. advocate a much larger amount of air, we found in accordance with Bull (1948), that this amount is quite sufficient for diagnostic purposes. The photographs were taken from a distance of 36", the patient being in a supine position.

Below only the AP views will be discussed; the transverse diameter of each anterior horn was measured separately for comparison (see Fig. 1). The vertical measurement is not a satisfactory indicator for ventricular dilation, as the lateral ventricles generally expand outwards, and indeed a closer statistical examination of the vertical measurements yielded inconclusive results. The only difficulty in measuring the transverse diameter was the indistinct outer edges of the anterior horns; this has been overcome by obtaining measurements by three different readers and taking the average value as the measurement.

The case material has been taken from one year's pneumo-encephalographic cases including the following: a) so-called pre-senile dementias who exhibited all clinical symptoms of an early deterioration, a diagnosis which was supported by psychometric tests; b) post-traumatic deterioration type; c) erroneously diagnosed cerebral tumors; d) chronic paraphrenia, chronic schizophrenia, and melancholia. The following cases have been excluded: a) those with no ventricular dilation; b) senile dementias; c) idiopathic epilepsies; d) cases of cerebral tumor, as they not only distort the ventricular contour, but also determine "lateralization."

Fig. 1.

* Director of clinical research, Netherne Hospital.

Results and Comments

The horizontal measurements were evaluated by analysis of variance in terms of 4 primary groupings, viz.:

1. Side (right or left lateral ventricle);
2. Sex of subjects (male or female);
3. Age of subjects (above 40 versus 40 and below);
4. Diagnosis of subjects (atrophy versus other conditions).

Classification of the subjects by sex, age and diagnosis yielded eight possible subclasses and from the available case-material falling into each of these, a random sample of three subjects was taken; thus the analysis was based on 24 cases.

The results for the measurements are set out in Tables I and II. It can be seen that the measurement of the left ventricle is greater than that of the right ventricle to a statistically significant extent. The significance at the 5% confidence level however, applies to the total material, thus lateralization does not seem to be a characteristic of any particular psychotic syndrome.

Ventricular dilation in the horizontal measurement in relation to sex is greater in males than in females to an extent that is statistically significant at the 1% level of confidence. This, of course, was to be expected as the average size and weight of the adult male brain is larger than that of the female. (Male average weight is calculated around 1,380 grams, and that of the female 1,250 grams.) In other words, the greater ventricular dilation in males can be attributed to general anthropometric differences.

The age grouping, above 40 and those of 40 or below, is, of course, an arbitrary subdivision of the cases whose ages varied between 21 and 58 years. No significant difference was found between the two opposed arbitrary age groupings. Although this seems to be contradictory to Heinrich's findings, it should be noted that the total case material showed ventricular dilation with lateralization, thus the progressive dilation with ageing was not contrasted to "normal" younger material. Yet another point emerging from this result is that of valuation, that is, on what roentgenological criteria the diagnosis "cortical atrophy" should be made. The non-significant relationship between age and ventricular dilation seems to confirm Lysholm's and Bull's (1948) opinion that the roentgenological diagnosis of cortical atrophy should be based on two simultaneous criteria: ventricular dilation and pathological amount of supra-cortical air.

A further support for such restricted criteria derives from the examination of diagnosis and ventricular dilation. There are no statistically significant differences in the ventricular measurements of patients in whom the diagnosis "cortical atrophy" has been made clinically, and of patients with a different diagnosis. This, of course, is not related to other X-ray criteria of cortical atrophy such as have been enumerated by Jackson (1946), and were also found in our cortical atrophy group.

As would be expected, after sex, age and nosological factors have been allowed for, there are still individual differences between subjects in their ventricular measurements. There are, however, no significant interactions in the horizontal measurements.

TABLE I

ANALYSIS OF VARIANCES HORIZONTAL MEASUREMENTS (IN MILLIMETERS)

Side	77.52	1	77.52	7.58*
Sex	165.02	1	165.02	16.13†
Age	22.69	1	22.69	2.22
Diagnosis	38.52	1	38.52	3.77
Side X Sex	1.02	1	1.02	<1
Side X Age	9.19	1	9.19	<1
Side X Diagnosis	0.52	1	0.52	<1
Sex X Age	13.02	1	13.02	1.27
Sex X Diagnosis	0.52	1	0.52	<1
Age X Diagnosis	7.52	1	7.52	<1
Side X Sex X Age	11.02	1	11.02	1.08
Side X Sex X Diagnosis	20.02	1	20.02	1.95
Side X Age X Diagnosis	0.52	1	0.52	<1
Sex X Age X Diagnosis	9.19	1	9.19	<1
Side X Sex X Age X Diagnosis	0.02	1	0.02	<1
Subjects with Sex Age and Diagnosis	381.00	16	23.81	2.33*
Error	163.67	16	10.23	—
TOTAL	920.98	47	—	—

*Statistically significant at or beyond 5% level of confidence.

†Statistically significant at or beyond 1% level of confidence.

TABLE II

MEAN VALUES OF MEASUREMENTS

Right ventricle	20.37 mm.	Left	22.92 mm.
Male subjects	23.50 mm.	Female	19.79 mm.

Conclusions and Summary

A closer investigation into ventricular sizes does not seem to support recent hy-

potheses of lateralization as it was offered on the basis of E.E.G. studies by Rey, et al (1949). It is not within the scope of the present paper to discuss the value of pneumo-encephalography in general, though serious objections against its usefulness and validity have been raised. Moreover, the value of the presented findings is diminished by being based on one type of measurement only, though technical difficulties justified its employment. The findings, though suggestive of several possibilities, do not allow a speculative commentary; they showed that in cases of ventricular enlargement—

1. the left is greater than the right;
2. males have greater enlargement than females;
3. the enlargement is not significantly different in advancing years;
4. there is no significant difference in size in cases diagnosed as "cortical atrophy" and in those diagnosed otherwise.

Author's Note: Grateful acknowledgment is made to Mr. J. P. S. Robertson for his assistance in statistical analysis.

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Two Year Report of a Veterans Administration Travelling Mental Hygiene Clinic

EVERETT F. LOMBARD, M.D., and WALTER F. ST. CLAIR, ED. D.
Manchester, New Hampshire

Introduction

In order to bring outpatient psychiatric treatment to as many eligible* veterans as possible in the State of New Hampshire, the idea of setting up a travelling mental hygiene clinic was conceived by the Manchester, New Hampshire Regional Office of the Veterans Administration. Psychiatric treatment had not been available to most of these veterans because there are relatively few psychiatrists in the State and because most of the population is scattered over a large rural area. Organization of a clinic team consisting of a psychiatrist, psychologist and social worker was approved early in 1947 and the clinic began operating in February 1948. By instituting a travelling unit it was hoped that treatment could be brought near enough to the veteran so that he need not lose an excessive amount of time from his training, schooling, work, or business to obtain it.

Initially it was planned to hold bi-weekly clinics in nine localities covering the entire State. However, on further consideration it seemed more practical to have weekly visits. Therefore, five clinics were located in the most populous areas.

One clinic is at the Regional Office in Manchester, a city of 77,000 located in the south central portion of the State. The other four clinics are in cities varying in population from 13,000 to 32,000. All locations are in the southern part of the State, 18 to 55 miles from Manchester. Because the majority of the people live in the southern part of the State, these clinic sites allow us to cover 70% of the population. Clinic facilities were secured in each city through the cooperation of various local and civic groups. An attempt was made to locate the clinic in a

From Veterans Administration Travelling Mental Hygiene Clinic, Manchester, New Hampshire.

*To be eligible for outpatient psychiatric treatment by the Veterans Administration, a veteran must have a nervous disability which has been rated by the Veterans Administration to be either service incurred or service aggravated or must be in training under the provisions of the Vocational Rehabilitation Act, Public Law 16.

building that was already known to the local people as a medical center so that the veterans attending the clinic would not have the feeling that they were being catalogued by their neighbors as "mental cases" when they went for treatment.

Since the clinic was an entirely new thing to the veterans of New Hampshire, the question of how to bring it to their attention had to be considered. It was finally decided to review the treatment files in the Manchester Regional Office and send a letter to the eligible veterans who were currently receiving treatment from their local physicians. This letter stated that a Mental Hygiene Clinic was being started in their ciy by the Veterans Administration and gave information as to how the veteran could contact it. A letter was also written to the local physicians who had been treating these veterans informing them of the opening of the clinic and calling their attention to the Veterans Administration regulation that, when available, only qualified psychiatrists would be authorized to treat veterans for psychiatric disorders. It urged the physician to feel free to write to the clinic in regard to future cases that might come to their attention. Approximately one hundred veterans were contacted and over 75% actually began treatment.

In each locality veterans were accepted for treatment from the immediate surrounding area. Those who came from outside the city where the clinic was held were entitled to have travel paid by the Government. The usual procedure was to send the veteran a ticket for bus or train at the time he was given his first appointment. If it was found that he travelled by private conveyance the appropriate forms were substituted. In most cases, following the veteran's first visit, he was able to state his regular mode of travel and either tickets or reimbursement forms for driving his own car were then automatically sent out.

Occasionally veterans living as far as forty miles away from a clinic location were given appointments. However, we found that none of these veterans kept up treatment because of the time and distance involved. From our experience it has been found inadvisable to schedule weekly appointments for a man living more than twenty miles away from any clinic location.

At the time of the first visit the next appointment was made. If a veteran missed an appointment he was automatically written a letter giving him another. This letter merely stated that, since he had missed his previous appointment, another one was being saved for him, with no question being raised as to why he had missed. If this second appointment was not kept a third appointment was given in a similar manner. If a veteran missed three consecutive appointments, a form letter was sent to him noting that he had missed three appointments and asking whether he wished to continue treatment. Most of these letters have been answered in the affirmative and the men have resumed treatment. In some cases where it had been determined that the veteran was not feasible for treatment, this follow-up was not made.

Since the clinic travels from place to place, its services were available to a particular veteran only one day a week. This made it impossible for the veteran to call on the clinic during the remainder of the week. Therefore, the question arose as to what he should do if he had an acute nervous upset. To take care of this problem the veteran was told that he could call on his local doctor and the Government would authorize payment. After two years of operation we feel that the fact that the clinic is only available to the veteran one day a week has not made it any less effective. The number of emergency treatments it has been necessary to authorize to outside physicians has been negligible.

Most mental hygiene clinics maintain late afternoon or evening hours so as to make their services available to men outside of their working day. The travelling clinic has not done this because of various factors which made it inadvisable such as the time consumed by the staff in returning to their homes, or the alternative inconvenience and expense of staying over night. The clinic hours usually run from 9:30 A.M. to 5:00 P.M. in each locality. Only two or three veterans out of the total seen by the Clinic in two years have been unable to arrange an appointment between those hours.

Intake

The clinic functioned for the first four months without the services of a social worker. Therefore, the intake work was done by the psychiatrist and the psychologist with the psychiatrist seeing all cases for an intake impression. At the first interview an attempt was made to answer as many of the veteran's questions regarding the clinic as possible. During the first interviews a number of veterans expressed resentment toward the Veterans Administration for the difficulties that they had experienced with it in the past, and in some cases because the Veterans Administration had taken them away from a doctor in whom they had confidence even though they were aware that the treatment they were receiving was not specifically aimed at the cure of their nervous and emotional disorders.

As might be expected, a good many requests for treatment were made on the basis of physical symptoms and many of these veterans were unaware of or resistant to accepting the emotional origin of the symptoms. An attempt was made to change this attitude in the veteran during intake and the first few interviews. At intake as much history was obtained as the veteran was willing to give. He was not pushed to give details that he obviously did not want to talk about, but areas of blocking were noted as potential sources of difficulty to be considered in later interviews. The veteran's essential folder was also abstracted in every case, not only to supply more details, but in some cases to corroborate the history given at intake. Following intake the cases were accepted by the psychiatrist for therapy or assigned to the psychologist for testing. Some cases are also carried on a treatment basis by the psychologist under the supervision of the psychiatrist.

With the addition of a social worker to the clinic team, the intake work was shifted to him, with the psychiatrist continuing to see each case for an intake impression. Some cases were also assigned to the social worker for case work and he has seen other members of veterans' families where it seemed advisable. During the first few months of operation no eligible veteran who requested or was referred for treatment was declared not feasible despite the fact that some were clearly so resistant to therapy as to make feasibility questionable. Now that the clinic is organized, more attention is given to the suitability of any particular case for treatment, with a few cases being declared non-feasible at intake.

Therapy

Our approach to therapy is more or less eclectic. Limited goals are set in most cases and then extended or modified as treatment progresses. Drug therapy is used rarely and always following a discussion with the veteran to point out that medicine is only supportive and not curative. A great majority of the veterans seen by the clinic have been under treatment with practically every known type of medication for a long enough time to enable them to see its futility as a cure.

Most cases are seen for weekly interviews of 45 to 50 minutes. A few veterans have been seen every two weeks and there are some who come but once a month. As would be expected, little progress has been made with those in the latter groups.

Experience has shown that the use of a permissive type of interview in which the therapist is friendly, understanding and non-critical is most successful. It is our policy not to do any interpretation until a positive relationship (transference) has developed with the patient. We find interpretation by indirect suggestion is in most cases better accepted by the veteran because it is less threatening. Through indirect suggestion the veteran gains not only intellectual insight, but also emotional insight which is of greater importance from a therapeutic standpoint.

We have not used group therapy to date in the clinic although we realize its value in a well-rounded psychiatric treatment program. The problem of developing this in conjunction with individual therapy in a travelling clinic is one that is still to be considered.

Results

The results of treatment have been evaluated for the two years of the clinic's operation. In the absence of objective criteria

to show the efficacy of treatment, subjective criteria were employed. The chief factors taken into consideration were the alleviation or absence of physical symptoms with which the veteran came to the clinic, statements of the veteran showing a positive attitude regarding effectiveness of treatment and evidence that he has been able to make a more satisfactory adjustment to his environment.

The usual diagnostic categories contribute little to the treatment of emotional disorders met with in this clinic. More important in the treatment approach is the discernment of the basic personality pattern which cannot be reduced to the brief terms used in diagnostic description. We have, therefore, concentrated on understanding the dynamics of the case and have foregone any attempt to place them in diagnostic categories in evaluating results.

Results were broken down into three categories, namely: "much improved," "improved," and "unimproved." A "much improved" veteran is one who is free of the symptoms or complaints which brought him to the clinic and has remained free for a long enough period so that it can be reasonably stated that a similar condition will not recur under any stress to which he is normally subjected. The status of 'improved" indicates that symptoms are less severe or occur less frequently and that the veteran has developed some emotional insight which enables him to recover more quickly when symptoms do occur. If no evidence of progress could be seen, the veteran was considered as "unimproved." The total group consisted of 175 veterans who had two or more therapeutic interviews during the period. Sixty-three of these were active cases at the time this report was made and 112 were inactive or had ceased completely.

TABLE I.

CLASSIFICATION OF CASES ACCORDING TO IMPROVEMENT CATEGORIES

Number of Patients

	Active	Inactive & Closed	Total Group
Much Improved	9	9	18
Improved	38	40	78
Unimproved	16	63	79
Total Groups	63	112	175

Table I shows that eighteen patients had shown marked improvement, seventy-eight were considered improved and seventy-nine had made no progress that could be discerned. Nine "much improved" cases are carried as active on the clinic rolls as they still come in from time to time to confirm further insight as it develops.

TABLE II.

PERCENTAGE OF FAILURE TO KEEP APPOINTMENTS

	Number of Cases	Average percentage of Failure	Standard Deviation
Much Improved	18	19.72	14.58
Improved	78	21.6	18.74
Unimproved	79	33.58	21.39
Total Group	175	25.39	19.5

Table II represents the percentage of missed appointments to the total number of appointments scheduled for each individual. The average percentage of failure to keep appointments is highest in the unimproved group (33.58%) and there appears to be a significant difference between groups. The greater variability of percentages within this unimproved group as indicated by the standard deviation of 21.39 led to further analysis which disclosed that the higher average is accounted for mainly by the inactive and closed 63 cases which average 35.36% as compared to the active case average of 26.53%. This larger percentage of missed appointments in the unimproved group probably indicates a greater amount of resistance to therapy. However, a brief study of the missed appointments discloses that factors outside the scope of therapy such as weather conditions, unexpected work, other duties which come up at appointment time, or inability to secure transportation have influenced these figures.

TABLE III

ANALYSIS OF TREATMENT RESULTS BASED ON NUMBER OF TREATMENT INTERVIEWS PER PATIENT.

	Number of Cases	Average number of Interviews	Standard Deviation
Much Improved	18	32.23	16.97
Improved	78	23.05	18.17
Unimproved	79	10.27	11.85
Total Group	175	18.33	17.66

Results of treatment were also analyzed according to the number of treatments per veteran. As would be expected, greater improvement is shown to be in proportion to the number of treatment interviews. There appears to be significant differences between each group as indicated by the averages but this is more noticeable when the unimproved group average of 10.27 is compared with the other two groups. It is also noticeable that the unimproved category is more closely grouped around its average with its standard deviation of 11.85. This shows that approximately 84% of the unimproved group had less interviews than the average improved case.

TABLE IV

ANALYSIS OF TREATMENT RESULTS BASED ON LENGTH OF TIME IN TREATMENT

	Number of Cases	Average Time in Months	Standard Deviation
Much Improved	18	15.67	6.87
Improved	78	10.90	6.62
Unimproved	79	5.67	4.43
Total Group	175	9.02	6.68

Table IV represents the number of months during which veterans were actively receiving treatment. In some cases veterans discontinued interviews temporarily for various reasons, returning for treatment when a more favorable opportunity existed or when symptoms increased in severity. Only the actual number of months in which the veteran had one or more treatment interviews has been considered in this analysis. Again we note a consistent trend which indicates that veterans who remain in treatment for longer periods of time will receive greater benefits. Comparison of the averages in each category show approximately the same differences between groups. The average of 5.67 months for the unimproved is 5.23 months less than that for the improved group. The low standard deviation of 4.43 for the unimproved groups shows that only 10% of this group were in active treatment as long as the average improved case.

In order to determine the cost of the treatment given by the Travelling Mental Hygiene Clinic in comparison to the average cost of psychiatric treatment, a study was made during a representative month of the clinic's operation. Taking into consideration all salaries including professional personnel and stenographic help, as well as the cost of transportation of veterans, and transportation and subsistence expenses of the professional staff, it was found that the cost per treatment inerview was $8.19. Other Veterans Administration clinics in this area which are stationary average $6.00 to $7.00 per interview. However, the time consumed by the staff in travel reduces the number of hours available for seeing veterans and the travel expense of the professional staff also increases the treatment cost.

In spite of this, the cost compares favorably with the average private psychiatric interview fee of $10.00. It should also be noted that having this treatment available to the veteran has, in many cases, kept him from being hospitalized. This results in a saving not only because the veteran is able to continue to work and support his family, but also because, according to a release from the U.S.P.H.S.,* the average cost of maintaining one patient for a year in a mental hospital is $731.00, or over $14.00 a week.

Conclusion

Because of a need for outpatient psychiatric treatment in the State of New Hampshire, the Veterans Administration has organized one mental hygiene clinic team which travels to five of the largest cities in the State.

After two years of operation the results show that providing treatment to veterans in this way is enirely feasible and that the cost of operating a travelling clinic compares favorably with the average cost of outpatient psychiatric treatment throughout the country.

Authors' Note: This paper is sponsored by the Veterans Administration and published with the approval of the Chief Medical Director. The statements and conclusions published by the authors are the result of their own studies and do not necessarily reflect the opinion or policy of the Veterans Administration.

*Sheldon, H. D.: Release from Federal Security Agency, U.S.P.H.S. Mental Hygiene Division, December 1, 1948.

Neurological Clinical Pathological Conference

of the

Cincinnati General Hospital

CHARLES D. ARING, M.D., *Editor*

J. H.—A 1503

Presentation

In January 1950 a 37-year-old, single woman employed as a maid, consulted an oculist because of reduced vision in the right eye. As far as could be determined the visual disturbance, described as clouding by the patient, had been of gradual onset during the previous few months. Also in January 1950, there had been some drawing pain in the head and particularly in the right temporal region and at times also on the left. These pains did not last long at any time.

There had been some regular headache, rather generalized, until the patient got glasses in 1937, which she had worn since that time for close work. Light bothered her eyes. Fortunately there was some record about her vision since she had consulted an optometrist in February 1947. At that time his record showed visual acuity on the right to have been 20/30 and on the left 20/20. At another visit in April 1949 there was loss of central vision on the right, the left visual acuity was 20/25.

The patient, youngest of ten children, had lived on a farm until her parents died. She had completed eight grades of school. The mother, aged 82, died after a stroke in 1938, and the father had died at the age of 79 of the residuals of an accident some years before the mother. The patient took care of her mother until she died. After the death of her parents she came to Cincinnati to work as a domestic. She had had an abortion some ten years ago. To direct question she noted that she was nervous; she had palpitation and mild dyspnea even when she was not excited. She said that her family irritated her; they were always offering advice and being critical of her. She occasionally wet the bed up to the age of 32, and there had been some dysmenorrhea. She had been struck by a car in 1941 and had suffered a fracture of the coccyx, which the siblings were inclined to dwell on as important in the present illness.

Abnormalities on physical examination were limited to the eyes. There was optic atrophy on the right with some constriction of the vessels in the retina. On January 12, 1950 the visual acuity on the left was 20/30 uncorrected, 20/20 corrected; and on the right 10/200 uncorrected and corrected. The field of vision of the left eye was normal except that the blind spot was slightly widened but of proper height. The field of vision for the right eye (Figure 1) showed appreciation of a 5 mm. object at 2 meters out to 25 degrees except at the fixation point and in the upper temporal quadrant, where she was totally blind. Within the nasal side of the field there was a small island of vision extending into upper and lower quadrants, where she could perceive a 3 mm. object. She had a crescentic area of vision for 10 and 20 mm. objects, between 25 and 35 degrees in the upper and lower quadrants of the nasal field and in the lower temporal quadrant. As already noted, the upper temporal quadrant was completely blind on the right only. The right pupil was 4 mm. and the left 3 mm. in diameter; the right pupil reacted sluggishly and through a lesser range than the left. There was a slight external strabismus on the right side. Blood pressure was 140/90.

A lumbar puncture was performed on February 10, 1950. Initial pressure was 165 mm. of water, and there were no cells; the protein was 37 mg.%, gold curve and Wassermann normal. The usual routine laboratory studies were normal, including roentgen plates of the skull.

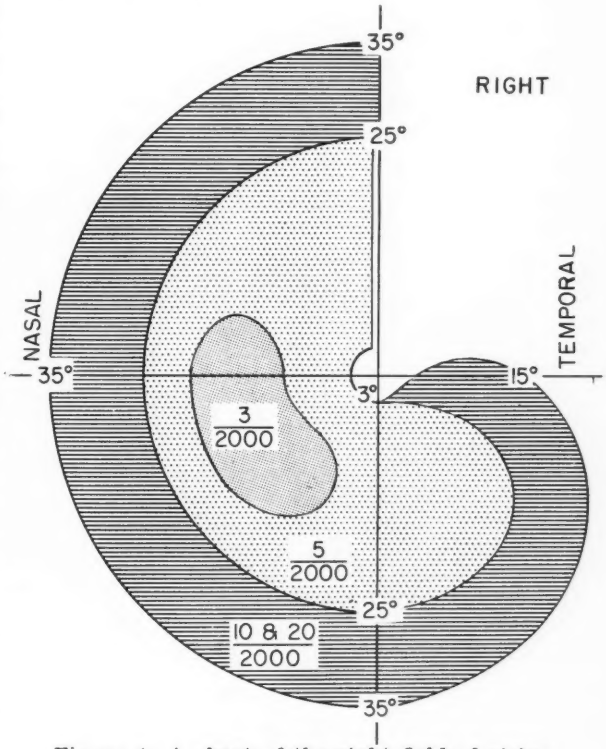

Figure 1. A chart of the right field of vision.

The patient had rather immediate generalized headache following the spinal puncture, which was promptly relieved by going to bed. It persisted for one or two days after the test and she had nausea and even vomiting when up. She could not eat for the two days after the tap. During the forenoon of February 13 she developed terrific headache even on reclining. It was throbbing and located on the

right. By the evening of February 14 she was much improved and got up for dinner. When she failed to appear for breakfast on the morning of February 15, a visit to her room disclosed that she was dead in bed.

Differential Diagnosis

Dr. Joseph P. Evans: The problem presented here does not, on the face of it, seem to be particularly complicated, and I would suspect the reason for selection of the case is to bring out certain points that are a matter of general interest.

The salient facts in the history of this 37-year-old woman are that she had normal vision in 1947. In April 1949 it was found that there was loss of central vision on the right whereas the visual acuity on the left was essentially normal. The data dealing with her past history and her background are presumably irrelevant to the present problem unless the so-called abortion was in reality a miscarriage and might conceivably have represented evidence of a luetic infection, but in view of the cerebrospinal findings that seems unlikely.

The objective findings revolve around the visual field disturbances and there is shown in figure 1 a diagram of the right visual field, the left having been essentially normal except for some widening of the blind spot. The cerebrospinal fluid findings and other laboratory data are normal and the x-ray findings are of little help. The lateral view of the skull is essentially normal; the clinoid processes are of normal size; the sella is normal; there is no erosion at the base to cause suspicion of an obvious lesion or even an indirect lesion which might cause boney change. The optic foramina are not unusual; the foramen on the left being slightly larger than that on the right.

After a lumbar puncture on February 10, there was generalized headache which may be significant. I see no special reason, however, for thinking that it was other than the usual headache accompanying the lumbar puncture, but it may have represented a prodrome of what happened on February 13 when she developed the terrific headache. It is of interest that this was on the right and I think it has localizing significance referable to January 1950 when she had the drawing pain in the head, particularly in the right temporal region (but also in the left) which pain I think had local signature. The severe headache of February 13 apparently passed or at least was considerably ameliorated because she was able to get up for dinner on the night before her demise. This final event happened without benefit of observation so what went on during the night is not known.

I think that it is reasonable to conclude that this patient had a lesion localized in the region of the right optic nerve and, in view of her episode of severe headache the day before her death and then her death in bed, that this patient had an aneurysm which ruptured and caused her death.

However, there might be a trap in this patient's history because it may be that she did not die of a ruptured aneurysm but of some other quite unrelated cause and we ought, therefore, to consider what other lesions of the right optic nerve could be responsible for the visual difficulty which she had. There is a very useful technique in making an etiological diagnosis which is worth elaborating upon, in which one considers the disease as falling into one of several possible general categories. The first might be considered congenital, the next developmental, then in order traumatic, infectious, metabolic, toxic ,vascular, degenerative, and neoplastic. Now if we analyze the problem in this patient in relation to these various categories we can legitimately rule out the likelihood of there being some type of congenital disease responsible for this disturbance. Developmentally one thinks in terms of embryology and since we've already proposed that this may be an aneurysm, one would want to consider the possibility of there being some abnormality in vascular development. Thus, this specific problem of aneurysm might be considered either in the developmental category or in the vascular category. There is no history of trauma and therefore, no reason for thinking that trauma played a role. Consideration of the general infections would hardly seem to be relevant to our problem, though one does consider such special space-consuming infectious processes as tuberculoma, and luetic processes must not be too lightly passed over. I think that it is enough merely to point out the general significance of this category. Meta-

bolic disturbances do not seem to be of particular concern. Toxic alterations would have to be considered in relation to the possibility of lead, arsenic, or nicotine playing a role in this visual difficulty because we know that those agents do attack the visual system. But a field of this type, I think, indicates pretty clearly that we are dealing with a mechanical type of lesion and the real problem is to determine what type of mechanical disturbance. We have already mentioned vascular lesions in relation to aneurysm. We might then consider whether the aneurysm was of congenital, luetic, or arteriosclerotic origin. The degenerative category, I think, can be eliminated without further consideration. So far as neoplasm is concerned, that is a very definite possibility in a case of this sort. A meningioma, for example, arising in the vicinity of the optic chiasm could very possibly cause this disturbance and as I suggested the cause of her death might be some other process entirely.

The disturbance in this case obviously involved the visual system somewhere between the globe and the occipital cortex, so that we have from the standpoint of localization to try to place the lesion somewhere in the visual system where it will produce the disturbances manifested in the patient's visual fields. It is reported that the field defect was in the upper quadrant; therefore, the lesion must be coming up from beneath to catch the inferior fibers which represent the upper quadrant. My own belief is that in this particular case, the lesion probably lay just anterior to the chiasm. It should be recalled that the optic nerve is very short in the intracranial cavity anterior to the bifurcation of the chiasm, though at times it may become stretched by a space-consuming lesion lying under it. There is little space between the optic foramen and the chiasm for a lesion to slip under the optic nerve and compress the nasal fibers from the under side and upward. I am influenced in my conclusion that the lesion lies anterior to the chiasm by my belief that an aneurysm is probably responsible for the disturbance. It would then seem that we are dealing with an aneurysm in relation to the optic nerve, lying on its mesial side and beneath it. An aneurysm of the carotid artery could conceivably cause such a disturbance, but it would almost certainly cause disturbance in the nasal field as well. One would think that the bifurcation of the anterior cerebral and the anterior communicating arteries would be the most likely site; however, an aneurysm there obviously lies above the chiasm, and we must assume that the lesion had a pedicle which allowed the main mass of the aneurysm to lie immediately underneath the chiasm in this region. That certainly is a reasonable possibility. Another possibility is an aneurysm of the ophthalmic artery which artery is given off from the internal carotid immediately after the latter leaves the cavernous sinus. It then runs forward alongside the optic nerve and on its mesial and somewhat inferior surface.

The localized headache is another symptom which may have significance. According to McNaughton's findings there are fibers supplying the vessels of the dura, derived largely from the first division of the trigeminal nerve. There are also some fibers running from the 2nd and 3rd divisions, particularly to the middle meningeal artery. You will recall that after the skull case is opened, one can operate on the brain without any pain whatsoever as long as one does not disturb the vessels of the meninges or pull on the dural structures or on the great vessels near the midline. I believe that the reason that this patient was having right-sided pain was because of the fact that the expanding lesion, which we've assumed to be present, was causing pressure on the first division of the trigeminal nerve.

In Geoffrey Jefferson's classical monograph on aneurysm the relationship of the trigeminal ganglion and of the extraocular nerves to the carotid artery is brought out. The aneurysm, we would have to assume, would have to be large enough somehow to cause compression of the first division. One should also consider the possibility that the process was truly an aneurysm of the carotid artery itself and that it was causing compression on the internal or nasal fibers of the optic nerve. Further it will be recalled that this patient had a strabismus. The loss in visual acuity was sufficient that the strabismus might well have been explained on the basis of the blindness of that

eye, or it is conceivable that there may have been some pressure on the third nerve which disturbed specifically those fibers having to do with eyeball movements.

My conclusion is that this patient had an aneurysm, probably of the anterior cerebral artery at the bifurcation of the anterior communicating artery or possibly its site of origin was the ophthalmic artery.

Dr. Benson Snyder: How do you so definitely rule out a neoplasm? Isn't it common to have slow-growing tumors in that area?

Dr. Evans: Yes. From the standpoint of the anatomical disturbance one cannot rule it out, but in view of all the data it seems a much less likely diagnosis.

Dr. Charles D. Aring: Dr. Lyle, would you elaborate on the visual fields for us?

Dr. Donald Lyle:* The optic nerves are separated by an angle of about 45 degrees. The intracranial length of the optic nerve is 1 cm.; the intracanalicular portion is about 6 mm., the intraorbital portion is about 3 cm., and the intraocular portion, through the sclera, is about 0.7 mm. That is the length of the optic nerve, approximately 5 cm. in all. The area in which we are interested is a very small field for localization.

In considering distribution of function, the quadrants of the retina are more or less analogous with the quadrants of the optic nerve in its central portion. Distally the macular fibers lie somewhat temporally in the optic nerve. They gradually assume a central position in the core of the optic nerve, but when they reach the optic chiasm there is a somewhat different distribution. There is a septum which comes in diagonally from above, which shunts the fibers into two groups, so that the nasal fibers assume a mesial and inferior position, and the temporal fibers a superior and lateral position. The macular bundle is more or less bisected although it is placed a little bit low in the optic nerve at the optic chiasm. Furthermore, the crossed fibers (the nasal fibers) form a knee in the lower quadrant of the opposite optic nerve just anterior to the chiasm. You can conceive of a lesion affecting these fibers on one side producing an upper temporal field defect on the opposite side. Decussating nasal fibers consist of about 3/5 of the total and the direct temporal fibers consist of about 2/5 of the total bulk of the nerves entering into the optic chiasm.

I believe the lesion in our case is on the right side, although conceivably could involve both nerves. As this space containing the intracranial portion of the optic nerve is rather small a lesion here can involve the other nerve if it assumes the proportion of a centimeter in size.

Optic nerve field defects frequently go over to the other side of the vertical meridian. Chiasmal lesions and lesions back in the tract and radiations usually stay homonymous throughout; they do not pass to the opposite side. Bilateral lesions in the cortex with heteronymous field defects are rather rare. As this field defect passes beyond the meridian, I would think that it involves the optic nerve. We know that the function of the other eye is normal and that we are dealing with a unilateral lesion that is right-sided. Now in this case we have an upper temporal field defect and fixation involvement, and therefore, we would place the lesion in the lower nasal fibers in the terminating optic nerve.

There are other changes in the visual field, and an optic atrophy was evident on ophthalmoscopic examination. I think these different field defects simply mean that with the optic atrophy other fibers besides lower nasal are involved. This speaks for a long, continuous process of gradual optic atrophy. Also, the fact that the eye turns out slightly shows that it is losing vision and does not have fixation; it is turning outward as blind eyes usually do, with few exceptions. So I think we can locate this lesion in the lower nasal quadrant of the right optic nerve with involvement of the right upper temporal field.

The next question is, what kind of a lesion would it be? Doctor Evans has discussed it very clearly, and I believe that he is correct in his deductions. The ophthalmic artery is the first major branch of the internal carotid artery, given off just after it penetrates the cavernous sinus, and it lies nasal to the optic nerve. At the intracanalicular portion of the optic nerve it lies inferiorly. At the first third of the intraorbital portion

*Professor of Ophthalmology.

of the optic nerve, it lies to the temporal side. In the middle third of the intraorbital portion, it lies above, and finally it terminates on the nasal side. In its devious course it is first nasal, then inferior, in the first third of the orbit it is temporal, in the second third, superior, and in the terminal third it passes nasally toward the trochlea. We are particularly interested in the ophthalmic artery in the intracranial portion, here it lies nasal or inferior. A lesion here could produce a field such as we have in this patient. The carotid artery lies inferior and temporal and if the lesion is an aneurysm, it could conceivably arise in the internal carotid artery and involve the ophthalmic artery to produce such a field defect. Then the anterior cerebral and the anterior communicating arteries are also in this little triangle lying superiorly. It is conceivable that a pedunculated aneurysm could come down into this area from one of those vessels and produce a visual field defect of this nature.

Pathological Discussion

Dr. Daniel Osher: The pathological diagnosis was ruptured aneurysm arising from the right internal carotid artery adjoining the optic chiasm. There was massive subarachnoid hemorrhage at the base of the brain and surrounding the spinal cord. There was edema of the brain.

The brain weighed 1480 grams after formalin fixation. The cerebral hemispheres were symmetrical; the gyri were flattened and diffusely stained brown. There was accumulation of blood in the sulci. There was massive subarachnoid hemorrhage covering the under surfaces of the frontal and temporal lobes, and the cerebellar hemispheres, more on the right than on the left. The basal cisterns were filled with blood clot. The cerebellar tonsils were herniated to a slight degree and approximated to the lateral aspect of the medulla.

A cystic mass approximately 1.5 cm. in diameter was continuous with and arose from the vessels of the anterior part of the circle of Willis on the right. The internal carotid artery on this side had been removed at its entrance into this mass. The origins of the right middle cerebral and posterior communicating arteries came off of the mouth of the sac. The right optic nerve was incorporated in the walls of this sac and was somewhat flattened and pushed forward by the mass. The anterior cerebral artery on the right was adherent to the mass anteriorly, and could not be traced past the mass. This was probably due to post mortem tearing as two anterior cerebral arteries were seen in the interhemispheral cleft. The anterior communicating artery could not be identified. The depths of the mass were adherent to the under surface of the chiasm by loose, fibrous adhesions. When it was stripped away, a hemorrhage was seen on the ventral surface of the chiasm. In examining the aneurysmal sac more closely it apparently arose from a normal sized internal carotid artery just as it emerged from the cavernous sinus and passed into the basal subarachnoid base. The rupture from the aneurysm had occurred at this point; the hole measured approximately 4 mm. in diameter.

Coronal sections were made through the cerebral hemispheres approximately 1.5 cm. in thickness. These revealed obvious congestion of the parenchyma but no other gross change. The ventricles contained blood clot. They were in a normal position and were of normal size. Multiple sections were made through the brain-stem and cerebellum and aside from the massive subarachnoid hemorrhage and interventricular clot, no gross abnormalities were noted.

After massive rupture of an aneurysm it is rather difficult to cleanly identify various structures and exact locations. This aneurysm arose from the right internal carotid artery at its junction with the various branches; it was a large aneurysm and was pressing on the under surface of the right side of the chiasma and optic nerve.

Clinical Diagnosis

Optic atrophy right, possibly on the basis of multiple sclerosis.

Dr. Evans' Diagnosis

Rupture of aneurysm on right internal carotid artery.

Pathological Diagnosis

Ruptured aneurysm of the right internal carotid artery.

Subarachnoid hemorrhage.

Edema of the brain.

Dr. Charles D. Aring: Was there no connection between the site of the hemorrhage and the ventricles?

Dr. Osher: No, there was no rupture into brain parenchyma.

Dr. Aring: We must presume, therefore, that the blood backed up against the usual circulatory flow through the foramina of Lushka and Magendie and filled the ventricular system in reverse.

Student: What part did the lumbar puncture play in the final episode?

Dr. Aring: I don't believe that we can answer that question satisfactorily. It is my feeling that in the vast majority of cases, including our patient, there is no causal relationship between lumbar tap and leakage. What evidently occurred here was a rather severe post-lumbar puncture headache, from which some sort of a recovery was being made. The leak then occurred three days after the tap had been done, death occurring some 36 hours or so later. We know that the hole in the meninges left by tapping remains for a week or longer and theoretically that cerebrospinal fluid may leak from the lumbar subarachnoid sac for that length of time. So it is a possibility that the intracranial pressure was lower than it had been previously and that there was accordingly lack of the usual support around the aneurysm.

Dr. Evans: Dr. Henry Ryder has evidence that suggests that even though there may be a continued loss of fluid, the intracranial pressure level becomes re-established quickly.

Student: Would you discuss the possibility that the aneurysm involved the oculmotor nerve and that the external strabismus and dilation of the pupil was caused by this?

Dr. Lyle: In an aneurysm in this area two of the chief symptoms usually are oculomotor paralysis and pain. But there was no history of muscle imbalance and she had had several ocular examinations. The muscle imbalance was first noted later on. Conceivably it could be the result of an aneurysm pressing on the oculmotor nerve. I believe it to be ever so much more likely that because of poor vision, the eye turned out.

Dr. Osher: The oculomotor nerve was healthy in the microscopic preparations.

Student: The thing that bothered me in this case was the emphasis on the temporal loss of vision in the right eye. There was a considerable loss of vision elsewhere in this field. It would seem to me that any time you have a lesion which might distort a nerve or press it against a boney structure, localization within it would be hazardous from visual field examination.

Dr. Lyle: It helps to pay attention to the first symptoms; later symptoms may be misleading in localization.

Dr. Aring: As Dr. Evans said, from the protocol the diagnosis is not too difficult. But for the physicians who first saw this lady, the diagnosis was difficult; in fact, the correct diagnosis was not made.

Dr. Osher: Was the patient seen by neurologists or neurosurgeons?

Dr. Aring: She was seen by ophthalmologists and neurologists.

Dr. Evans: Would you not agree that it should have been possible to make a localizing diagnosis but not an etiological diagnosis?

Dr. Aring: I believe so.

Dr. Osher: Wouldn't you also agree that in such localization, one of the most likely lesions to be thought of is an aneurysm?

Dr. Aring: I should think so.

Dr. John Campbell: Was there any evidence of rupture into the temporal horn?

Dr. Osher: There was no evidence of any rupture into the parenchyma of the brain.

Dr. Aring: Was there any subdural hemorrhage?

Dr. Osher: No, only in the subarachnoid space.

Dr. Aring: We occasionally see the rupture of the hemorrhage through the thin leptomeninges, into the subdural space and a large accumulation of subdural blood at the base. Dr. Evans' point about why these contained subarachnoid hemorrhages kill is well taken.

Dr. Osher: The only thing I can suggest is that there was marked compression of the brain by this acute addition of extra content to the intracranial cavity.

Dr. Aring: Subarachnoid hemorrhage happens so frequently, and we aren't accustomed to looking upon contained subarachnoid hemorrhage as causing death rapidly. If it dissects into the cerebrum that is another matter.

Dr. Osher: We don't know how long before death this hemorrhage occurred; it may have been many hours before death, and she may have been in bed unconscious. This bleeding started at the base. Our cerebral sections show massive subarachnoid bleeding over the hemispheres and backing of the blood into the ventricular system. It is hard for me to conceive of this as a sudden death because I don't think the blood could have distributed itself in the manner that it did so quickly.

Dr. Frank Espey: I was wondering if the right-sided pain and visual symptoms described would warrant an angiogram, and if such field defects are indications for angiography?

Dr. Evans: Yes, I would think so.

Medical Contraindications To the Use of Sodium Pentothal for Narcosynthesis

LEONARD TILKIN, M.D.
Chicago, Illinois

The clinical use of sodium pentothal as an anesthetic agent was introduced by Lundy and Tovell[1-3] at the Mayo Clinic in 1934. Through the years, the drug has proved extremely successful for procedures requiring an ultra-short acting anesthetic. Extensive studies have been published concerning the various phases of sodium pentothal, including its clinical uses and modes of administration,[4-85] the pharmacology,[86-94] the complications[95-107] arising from its use, and the idiosyncrasy[108-110] to its use.

Since the earliest use of the drug there have been accepted by the authorities in the fields of surgery and anesthesiology definite contraindications[111-113] to its use. Modification and confirmation of the contraindications have continued to be reported in the literature up to the present day.

Despite some reports of the use of sodium pentothal in the presence of previously accepted contraindications,[114-115] the general attitude is to accept the following conditions as definite contraindications: marked hypotension or hypertension, coronary disease, cardiac decompensation, myocardial damage, hepatic damage, respiratory obstruction of any type, and any gross abnormality of metabolic activity or other factors that would be generally debilitating to the patient's physical condition.

Thus, projecting the above information to the psychiatric use of sodium pentothal for narcosynthesis, we have accepted the same conditions as contraindications.

In a series of 400 interviews with 125 individuals, the breakdown of which will be reported in a future paper of this series, we accepted candidates for pentothal interviews on the fundamental assumption that they were free from any contraindications listed above. This series was selected at random, entirely unrelated to specific psychiatric diagnosis.

In the entire series we encountered only three complicating episodes that merited consideration and are herein reported:

Case No. 1: R. C., a 19 year old white male, had received two previous pentothal interviews uneventfully. At the time of his third interview, he entered the office a day following an acute gastro-intestinal upset, but at this time was feeling better and had just eaten. Pentothal was injected and the patient began to vomit profusely—a blood stained vomitus—and momentarily seemed to have respiratory embarrassment. The patient was brought to a sitting position and in short time regained good color and reacted favorably.

Case No. 2: V. F., a 23 year old white female, had received one previous interview successfully. On the second interview the patient had a cold complicated by bronchitis, but apparently seemed sufficiently improved to discount her condition as a contraindication. On the injection of the pentothal, the patient became markedly cyanotic and began to cough. By raising the patient to a sitting position the coughing subsided, the patient regained color and there were no further complications.

Case No. 3: C. P., a 40 year old white male, offered a negative history on questinoning concerning all medical illnesses. On the first interview under pentothal the patient became cyanotic and coughed. The patient was placed in a sitting position and complications were eliminated. Further questioning by exact terminology revealed the patient has "forgotten to mention" he had once had bronchial asthma.

In Case No. 1 described above, there existed the possibility of an obstructive atelectasis from the vomitus; and since that time, has caused a more careful evaluation on the part of the author to rule out even recent gastro-intestinal upset as a possible superficial cause of an irregular reaction to pentothal.

Case No. 2 made the writer aware that even conditions such as acute coryza and bronchitis that involve and impair the respiratory function must be respected, even in the healing stage, as a possible contraindication to the use of sodium pentothal.

Case No. 3 was an example of the fact that any disease that involves the respiratory tract in any manner, even though it may be chronic in nature and allergic in manifestation, should be considered as a contraindication to the use of sodium pentothal.

It has been the purpose of this paper to

review the basic accepted contraindications to the use of sodium pentothal as applied to psychiatric use in narcosynthesis; and to demonstrate the necessity of respect, as well as awareness, of any medical conditions that may complicate the use of the drug. When such complications are encountered consistently in relation to the medical condition that exists, we must then include the organic condition in the category of contraindications.

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